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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,386	01/02/2004	Jian-Kang Zhu	247354US20DIV	9333
22850 7590 04/09/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER BAUM, STUART F	
			ART UNIT	PAPER NUMBER
			1638	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		04/09/2007	ELECTRONIC	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/09/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/749,386

Applicant(s)

ZHU ET AL.

Examiner

Stuart F. Baum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 36 and 43-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 36 and 43-61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 9/20/2006
- ☐ Notice of Informal Patent Application
- ☒ Other: sequence search result

**DETAILED ACTION**

1. The amendment filed 1/3/2007 has been entered.
2. Claims 36 and 43-61 are pending.  
Claims 1-35 and 37-42 have been canceled.  
Claims 43-61 have been newly added and are drawn to the elected invention.
3. Claims 36 and 43-61, including SEQ ID NO:1 encoding SEQ ID NO:2 are examined in the present office action.
4. Rejections and objections not set forth below are withdrawn.
5. The text of those sections of Title 35, U.S. Code not included in this office action can be found in a prior office action.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 59 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 59 recites the limitation "wherein said plant organ" in claim 36. There is insufficient antecedent basis for this limitation in the claim.

***Written Description***

7. Claim 36 remains rejected and new claims 43-45, 47-50, 52-61 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is maintained for the reasons of record set forth in the Official action mailed 7/3/2006. Applicant's arguments filed 1/3/2007 have been fully considered but they are not persuasive.

Applicants contend the specification provides an adequate description to allow the skilled artisan to recognize what has been invented and what is claimed is adequately described in the specification (page 11 of Remarks, 1<sup>st</sup> paragraph). Applicants contend the SOS1 gene from Arabidopsis is disclosed as SEQ ID NO:1 along with the encoded protein of SEQ ID NO:2 (page 11 of Remarks, 2<sup>nd</sup> paragraph). Applicants contend the specification discloses parameters by which homology/identity can be ascertained and a description of SOS1 Na<sup>+</sup>/H<sup>+</sup> antiporter activity (*Ibid*). Applicants contend several mutant forms of SOS1 are disclosed. Applicants contend one skilled in the art could use the teachings in the specification and determine sequences meeting the claimed invention (page 11 of Remarks, 3<sup>rd</sup> paragraph). Applicants have submitted an alignment of eight proteins from various species of plants having Na<sup>+</sup>/H<sup>+</sup> antiporter activity (paragraph bridging pages 11 and 12 of Remarks). Applicants contend analyzing the N-terminal region of the SOS1 protein that includes the 12 transmembrane domains, the percent identities of the analyzed region among the eight selected proteins increases compared to the previous alignment, except for the moss SOS1 (page 12 of Remarks, 1<sup>st</sup> paragraph).

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The Office contends that for claims drawn to SEQ ID NO:1 or polynucleotides encoding SEQ ID NO:2, Applicants have satisfied the written description requirement. The Office contends that for claims drawn to sequences exhibiting less than 100% sequence identity to SEQ ID NO:1 or polynucleotides encoding polypeptides exhibiting less than 100% sequence identity to SEQ ID NO:2, the written description requirement is not satisfied. Applicants have only disclosed those techniques that would be required by one of skill in the art to isolate other potential sequences. At the time of filing of the instant application, Applicants were not in possession of the broadly claimed genus of any SOS1 protein having  $\text{Na}^+/\text{H}^+$  antiporter activity or any polynucleotide that is at least 70% identical to SEQ ID NO:1 or any polynucleotide that encodes a polypeptide that is at least 70% identical to SEQ ID NO:2. The Office contends that Applicants have not provided any publication dates associated with the aligned proteins. In fact, the Office looked up two proteins, NHX7 and Q4W3B5 and the earliest publication date was after the filing of the instant application. Applicants fail to describe a representative number of polynucleotide sequences from plants encoding a SOS1 protein falling within the scope of the claimed genus of all SOS1 genes from all plants. Furthermore, Applicants fail to describe structural features common to members of the claimed genus of polynucleotides. Therefore, the Office contends Applicants have not satisfied the written description requirement for the broadly claimed genus at the time of filing of the instant application.

### ***Enablement***

8. Claim 36 remains rejected and new claims 43-61 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a

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way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This rejection is maintained for the reasons of record set forth in the Official action mailed 7/3/2006. Applicant's arguments filed 1/3/2007 have been fully considered but they are not persuasive.

Applicants contend the specification provides a detailed explanation of cloning, expressing and characterization of the polynucleotides and/or polypeptides that fall within the claimed invention and how to assess the up-regulation of expression due to salt stress (page 13 of Remarks, 4<sup>th</sup> paragraph). Applicants contend determining which sequences fall within the scope of the claimed invention would be apparent to the skilled artisan with the present application in hand (page 13 of Remarks, 6<sup>th</sup> paragraph). Applicants contend determining which polynucleotide sequences fall within the scope of the claimed invention would require nothing more than routine experimentation (page 14 of Remarks, 2<sup>nd</sup> full paragraph). Applicants contend that each and every possible method by which the proteins' activities are increased, in and of itself, is not sufficient to support an enablement rejection nor is the omission of a working example (page 15 of Remarks, 1<sup>st</sup> paragraph).

The claimed invention is not supported by an enabling disclosure taking into account the *In re Wands* factors (858F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988)). *In re Wands* lists a number of factors for determining whether or not undue experimentation would be required by one skilled in the art to make and/or use the invention. These factors are: the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples of the invention, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the

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breadth of the claim. The Office contends that the lack of working examples in and of itself, is not sufficient to support an enablement rejection. But, taken together with the state-of-the-art and the level of unpredictability as discussed in the office action mailed 7/3/2006, and the breadth of the claims, the Office has determined that undue trial and error experimentation would be required by one of skill in the art, to practice the broadly claimed invention.

Applicants state "...filling of a patent application serves as conception and constructive reduction to practice of the subject matter described in the application (MPEP §2138.05). Moreover, MPEP §2138.05 states 'the inventor need not provide evidence of either conception or actual reduction to practice when relying on the content of the patent application'" (page 15 of Remarks, 2<sup>nd</sup> paragraph).

The Office contends, that MPEP §2138.05 also states "Proof of a constructive reduction to practice requires sufficient disclosure under the "how to use" and "how to make" requirements of 35 U.S.C. 112, first paragraph. *Kawai v. Metlesics*, 480 F.2d 880, 886, 178 USPQ 158, 163 (CCPA 1973)". The Federal Circuit has repeatedly held that "the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation'" (See MPEP 2164.08). The Office contends Applicants have not disclosed how to make and/or use the broadly claimed invention, as stated in the office action mailed 7/3/2006, and therefore Applicants are not enabled for the broadly claimed invention.

Applicants contend Shi et al (2002, *Nature Biotechnology*, published online) presents results that are in accordance with the methods set forth in the present application and provide a "proof of principal" with respect to the functionality of the claimed invention using SOS1 from *Arabidopsis* (page 15 of Remarks, 3<sup>rd</sup> paragraph). Applicants contend that Martinez-Atienza et

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al (2006, Plant Physiol., Plant Physiology Preview) disclose that the present invention works using a SOS1 sequence from rice, which has 60% identity (*Ibid*).

The Office invites Applicants to submit a 37 CFR §1.132 Declaration with the required information to demonstrate enablement of the broadly claimed invention.

***Claim Rejections - 35 USC § 102***

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9. Claims 36, 43-52, 57-60 are rejected under 35 U.S.C. 102(a) as being anticipated by Liu et al (2000, PNAS 97(7):3730-3734).

The claims are drawn to a method of increasing the salt tolerance of a plant, comprising increasing the expression of a polynucleotide encoding a SOS1 protein, as compared to the expression of said polynucleotide in the wild-type of said plant, or wherein said polynucleotide comprises a sequence that is at least 70%, 80%, 90, or 100% identical to SEQ ID NO:1 or wherein said polynucleotide encodes a polypeptide that is at least 70%, 80%, 90, 95% or 100% identical to SEQ ID NO:2, or wherein the plant is Arabidopsis.

The Office interprets “comprising increasing the expression of a polynucleotide encoding a SOS1 protein” to read on any method, either directly or indirectly that would increase the expression of said polynucleotide. Applicants have stated “SOS1 mRNA was detected without stress treatment but was significantly up-regulated by salt stress” (page 17 of specification, 2<sup>nd</sup> paragraph).

Liu et al disclose Arabidopsis plants that are grown on media containing NaCl (see page 3733, section titled “SOS2 Expression in the Root is Up-Regulated by Salt Stress”). Therefore,



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based on Applicants' own admitted statement as discussed above, said plants would have an increased expression of SOS1 compared to wild-type plants not grown on said media. The Office contends that SOS1 was isolated from Arabidopsis, and therefore would exhibit 100% sequence identity with Applicants' SEQ ID NO:1 and would encode a protein exhibiting 100% sequence identity with Applicants' SEQ ID NO:2, and as such, Liu et al anticipate the claimed invention.

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper time wise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 36 and 43-61 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-11, 19-22, 29-33, 41-4452-55, 63-66 of U.S. Patent No. 6,727,408 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are obvious over the claims of Patent No. 6,727,408 B2.

Claims 36 and 43-61 are drawn to a method of increasing the salt tolerance of a plant, comprising increasing the expression of a polynucleotide encoding a SOS1 protein, as compared to the expression of said polynucleotide in the wild-type of said plant, or wherein said polynucleotide comprises a sequence that is at least 70%, 80%, 90, or 100% identical to SEQ ID NO:1 or wherein said polynucleotide encodes a polypeptide that is at least 70%, 80%, 90, 95% or 100% identical to SEQ ID NO:2, or wherein the plant is Arabidopsis:

Claims 8-11, 19-22, 29-33, 41-4452-55, 63-66 of U.S. Patent No. 6,727,408 B2 are drawn to a transgenic plant and method of making a transgenic plant comprising introducing an isolated polynucleotide comprising a nucleic acid sequence comprising SEQ ID NO:1 or encoding the polypeptide of SEQ ID NO:2. The Office contends Applicants' SEQ ID NO:1 exhibits 100% sequence identity with SEQ ID NO:1 from U.S. Patent No. 6,727,408 B2 (sequence search results included).

Though the claims are not identical, they are not patentably distinct because the claims of U.S. Patent No. 6,727,408 B2 are drawn to a method that is encompassed by the claims of the instant application and would produce a plant that has increased salt tolerance.

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11. No claims are allowed.
12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

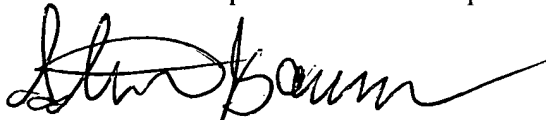
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stuart F. Baum whose telephone number is 571-272-0792. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached at 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

A handwritten signature in black ink, appearing to read "Stuart F. Baum", with a long horizontal flourish extending to the right.

Stuart F. Baum Ph.D.

Primary Examiner

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March 30, 2007

STUART F BAUM, PH.D  
PRIMARY EXAMINER

<!--StartFragment-->RESULT 1  
US-09-824-734-1  
; Sequence 1, Application US/09824734  
; Patent No. 6727408  
; GENERAL INFORMATION:  
; APPLICANT: ZHU, JIAN-KANG  
; APPLICANT: SHI, HUAZHONG  
; APPLICANT: ISHITANI, MANABU  
; APPLICANT: STEVENSON, BECKY  
; TITLE OF INVENTION: PROTEINS AND DNA RELATED TO SALT TOLERANCE IN PLANTS  
; FILE REFERENCE: 205644US20  
; CURRENT APPLICATION NUMBER: US/09/824,734  
; CURRENT FILING DATE: 2001-04-04  
; PRIOR APPLICATION NUMBER: US 60/194,648  
; PRIOR FILING DATE: 2000-04-04  
; NUMBER OF SEQ ID NOS: 20  
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US-09-824-734-1

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Query Match          100.0%; Score 6076; DB 3; Length 6076;
Best Local Similarity 100.0%; Pred. No. 0;
Matches 6076; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Db	1321	CAATTGCAGTGAGCTATTTTCGCATACTACACTGTACGTCTTTCTGTAGACCTTGAATTCC	1380
Qy	1381	TGTGCTAAGATATTCTCTTTGTAGTAAACTGAGAGTTTATTGTGTGACAGGCTCAAGAG	1440
Db	1381	TGTGCTAAGATATTCTCTTTGTAGTAAACTGAGAGTTTATTGTGTGACAGGCTCAAGAG	1440
Qy	1441	TGGGCTGGGGCTTCTGGTGTTTTGACGGTCATGACTTTGGGCATGTAAATTTTCAGTGATC	1500
Db	1441	TGGGCTGGGGCTTCTGGTGTTTTGACGGTCATGACTTTGGGCATGTAAATTTTCAGTGATC	1500
Qy	1501	TCGTTATTTTTTTTTTCCCTTTCTTTTGTATCATTTAAGAAGTCTCTTCTCATAAAATA	1560
Db	1501	TCGTTATTTTTTTTTTCCCTTTCTTTTGTATCATTTAAGAAGTCTCTTCTCATAAAATA	1560
Qy	1561	ACTGTAACAGGTTTTATGCTGCATTTGCAAGGACAGCCTTTAAAGGTGACAGTCAAAAAA	1620
Db	1561	ACTGTAACAGGTTTTATGCTGCATTTGCAAGGACAGCCTTTAAAGGTGACAGTCAAAAAA	1620
Qy	1621	GCTTGCATCACTTCTGGTATTTCCAGAACTTGTGGAATTTGGACTTGTTTTTTTATATTG	1680
Db	1621	GCTTGCATCACTTCTGGTATTTCCAGAACTTGTGGAATTTGGACTTGTTTTTTTATATTG	1680
Qy	1681	TAACTCTATGTAAAAGGTTGATCTGTGTGATATAAAATTTCCCGGTAAGTGTGCAGGGA	1740
Db	1681	TAACTCTATGTAAAAGGTTGATCTGTGTGATATAAAATTTCCCGGTAAGTGTGCAGGGA	1740
Qy	1741	AATGGTTGCATATATTGCAAACACTTTGATATTTATCCTCAGGTAAGGGTAAATTTTATA	1800
Db	1741	AATGGTTGCATATATTGCAAACACTTTGATATTTATCCTCAGGTAAGGGTAAATTTTATA	1800
Qy	1801	GACTCATATCATGCTTGTGCTTGCCAACCCCTAAAATAGAAGCTCATGGGTAGAAAAAAGA	1860
Db	1801	GACTCATATCATGCTTGTGCTTGCCAACCCCTAAAATAGAAGCTCATGGGTAGAAAAAAGA	1860
Qy	1861	GCTATTTTACTGCAGTCTACTCTTTAGCCTGGTGTGCAATATTGACTGTGTTTCTCGTT	1920
Db	1861	GCTATTTTACTGCAGTCTACTCTTTAGCCTGGTGTGCAATATTGACTGTGTTTCTCGTT	1920
Qy	1921	TTATGTTTGCAGTGGTGTGTCATTGCTGAAGGCATTCTCGACAGTGATAAGATTGCCTA	1980
Db	1921	TTATGTTTGCAGTGGTGTGTCATTGCTGAAGGCATTCTCGACAGTGATAAGATTGCCTA	1980
Qy	1981	CCAAGGTGCCATTATTTAATGTTGATAGTGACAGTATTTTTTTCCTAGCTAAAGTAAAT	2040
Db	1981	CCAAGGTGCCATTATTTAATGTTGATAGTGACAGTATTTTTTTCCTAGCTAAAGTAAAT	2040
Qy	2041	TTTGTGAACATAGTTTTGTCTGCATTTTCGACAGTTCAGTGTAAATTGAAGATGAGATCT	2100
Db	2041	TTTGTGAACATAGTTTTGTCTGCATTTTCGACAGTTCAGTGTAAATTGAAGATGAGATCT	2100
Qy	2101	AAGTCATTACATAGGACTCCACCTGTTATCATAGTTTTCTGTCGTTGTTAACACACCTT	2160
Db	2101	AAGTCATTACATAGGACTCCACCTGTTATCATAGTTTTCTGTCGTTGTTAACACACCTT	2160
Qy	2161	ACTGTTTCATGGTCTTTGGTTCTCGAAGGATCACTAATTCATAACGTGAATCAGTTACAA	2220
Db	2161	ACTGTTTCATGGTCTTTGGTTCTCGAAGGATCACTAATTCATAACGTGAATCAGTTACAA	2220



QY	2221	GAATAAGAAAAAACTGGCATTATTGGTTACGAAATATTGAGCGAAAGTTACCACTGTGC	2280
Db	2221	GAATAAGAAAAAACTGGCATTATTGGTTACGAAATATTGAGCGAAAGTTACCACTGTGC	2280
QY	2281	TAGGACTGAGACAATTGTATTCTTTCACCAGTCTGTTATTATTATTAAGTACCTGTTAGA	2340
Db	2281	TAGGACTGAGACAATTGTATTCTTTCACCAGTCTGTTATTATTATTAAGTACCTGTTAGA	2340
QY	2341	GATGTACTGTCTTGGAAACCATATATTTTTCTCTGGAACCATATCTGCATAAGGCACATG	2400
Db	2341	GATGTACTGTCTTGGAAACCATATATTTTTCTCTGGAACCATATCTGCATAAGGCACATG	2400
QY	2401	ATATACTTAACTTAACTATTTTTTATATTTTGGATCTAACAACCTCTTCACGACCCAAAT	2460
Db	2401	ATATACTTAACTTAACTATTTTTTATATTTTGGATCTAACAACCTCTTCACGACCCAAAT	2460
QY	2461	TTCTTACAGGGAATTCATGGCGATTTCTTTTTCTGCTATACGTTTACATCCAACATATCGC	2520
Db	2461	TTCTTACAGGGAATTCATGGCGATTTCTTTTTCTGCTATACGTTTACATCCAACATATCGC	2520
QY	2521	GTGTTGTTGTTGTTGGAGTTCTATATCCACTTTTATGTCGTTTTGGCTATGGTTTGGATT	2580
Db	2521	GTGTTGTTGTTGTTGGAGTTCTATATCCACTTTTATGTCGTTTTGGCTATGGTTTGGATT	2580
QY	2581	GGAAAGAATCCATTATACTCGTATGGTCTGGTTTGAGGGGCGCAGTGGCTCTTGCACTTT	2640
Db	2581	GGAAAGAATCCATTATACTCGTATGGTCTGGTTTGAGGGGCGCAGTGGCTCTTGCACTTT	2640
QY	2641	CTTTATCCGTGAAGGTTAATTTTAAGAACATCTGTTAAAGTTGTTCTTCTCTTAAATT	2700
Db	2641	CTTTATCCGTGAAGGTTAATTTTAAGAACATCTGTTAAAGTTGTTCTTCTCTTAAATT	2700
QY	2701	TCTGCACAATGTTTTTTCCAGCCACATTGATTCTGTGCTGACTTACTCGCACTCATTG	2760
Db	2701	TCTGCACAATGTTTTTTCCAGCCACATTGATTCTGTGCTGACTTACTCGCACTCATTG	2760
QY	2761	ATTCAGCAATCAAGCGGAAATTCACATATCAGCAAGGAGACTGGAACATTGGTAAGTTAG	2820
Db	2761	ATTCAGCAATCAAGCGGAAATTCACATATCAGCAAGGAGACTGGAACATTGGTAAGTTAG	2820
QY	2821	TCTAAAGATGTTATTGACAACCTTAAAATGATTATGCAAATTATTGTTTTGTCTCTTCATA	2880
Db	2821	TCTAAAGATGTTATTGACAACCTTAAAATGATTATGCAAATTATTGTTTTGTCTCTTCATA	2880
QY	2881	TTCTCAGTTCTTTTGCAGTTTCTTTTCTTCACGGGTGGAATTGTGTTCCCTAACTCTGATA	2940
Db	2881	TTCTCAGTTCTTTTGCAGTTTCTTTTCTTCACGGGTGGAATTGTGTTCCCTAACTCTGATA	2940
QY	2941	GTTAATGGATCCACTACCCAATTTGTTCTACGCCTTCTTCGCATGGATATTTTACCAGCC	3000
Db	2941	GTTAATGGATCCACTACCCAATTTGTTCTACGCCTTCTTCGCATGGATATTTTACCAGCC	3000
QY	3001	CCCAAGGTCAAAAACCTTCTCTCATACGAATAACTTCCGAGTTTTAAGTAATCAAATATA	3060
Db	3001	CCCAAGGTCAAAAACCTTCTCTCATACGAATAACTTCCGAGTTTTAAGTAATCAAATATA	3060
QY	3061	TGTGTAAACAGAGATTTTTTTGCTTATGCTTTGTATTTCATGTGTAAGTGACCGTGTTAGC	3120
Db	3061	TGTGTAAACAGAGATTTTTTTGCTTATGCTTTGTATTTCATGTGTAAGTGACCGTGTTAGC	3120

Qy	3121	CTGAGTCTGAGCCTTTAAGCTGTATAGTTCAATAGGGTCTGTATGTTCTAGTCAGTAATG	3180
Db	3121	CTGAGTCTGAGCCTTTAAGCTGTATAGTTCAATAGGGTCTGTATGTTCTAGTCAGTAATG	3180
Qy	3181	TATTCGAAGAACCTTATTAGAAACCACTTTCCTTTTGACAGAAACGAATATTGGAATATA	3240
Db	3181	TATTCGAAGAACCTTATTAGAAACCACTTTCCTTTTGACAGAAACGAATATTGGAATATA	3240
Qy	3241	CAAAGTACGAAATGTTGAATAAGGCCCTACGAGCGTTTCAAGATCTAGGAGACGATGAGG	3300
Db	3241	CAAAGTACGAAATGTTGAATAAGGCCCTACGAGCGTTTCAAGATCTAGGAGACGATGAGG	3300
Qy	3301	AGCTAGGACCTGCTGACTGGCCTACAGTTGAAAGTTATATTTCAAGCCTAAAAGGTTTCAG	3360
Db	3301	AGCTAGGACCTGCTGACTGGCCTACAGTTGAAAGTTATATTTCAAGCCTAAAAGGTTTCAG	3360
Qy	3361	AAGGGGAACCTAGTTCATCATCCTCACAATGGCTCTAAAATTGGAAGTCTTGACCCTAAAA	3420
Db	3361	AAGGGGAACCTAGTTCATCATCCTCACAATGGCTCTAAAATTGGAAGTCTTGACCCTAAAA	3420
Qy	3421	GTTTAAAGGACATACGTATGCGGTTCTTAAATGGTAGTTATGATCATGTACCCTCCAATA	3480
Db	3421	GTTTAAAGGACATACGTATGCGGTTCTTAAATGGTAGTTATGATCATGTACCCTCCAATA	3480
Qy	3481	TACTATTTTACCTGGTAGATTATTGACACTTTGAAAATTGGTTGTGTGTCAGGTGTGCAAGC	3540
Db	3481	TACTATTTTACCTGGTAGATTATTGACACTTTGAAAATTGGTTGTGTGTCAGGTGTGCAAGC	3540
Qy	3541	AACTTACTGGGAGATGCTTGATGAGGGCAGAATATCTGAAGTTACTGCTAATATTTTGAT	3600
Db	3541	AACTTACTGGGAGATGCTTGATGAGGGCAGAATATCTGAAGTTACTGCTAATATTTTGAT	3600
Qy	3601	GCAGTCAGTGGATGAGGCGCTTGATCAGGTTTCTACAACCTTATGTGATTGGAGAGGTCT	3660
Db	3601	GCAGTCAGTGGATGAGGCGCTTGATCAGGTTTCTACAACCTTATGTGATTGGAGAGGTCT	3660
Qy	3661	AAAACCACATGTCAATTTCCCAAATTACTACAACCTTCTTCATTCTAAAGTTGTCCCACG	3720
Db	3661	AAAACCACATGTCAATTTCCCAAATTACTACAACCTTCTTCATTCTAAAGTTGTCCCACG	3720
Qy	3721	CAAGTTGGTCACATACTTTGCTGTGCGAAAGACTAGAATCTGCTTGCTACATTTCTGCTGC	3780
Db	3721	CAAGTTGGTCACATACTTTGCTGTGCGAAAGACTAGAATCTGCTTGCTACATTTCTGCTGC	3780
Qy	3781	GTTTCTTCGCGCACATACAATTGCACGACAGCAATTGTATGATTTTCTAGGTATGTACAA	3840
Db	3781	GTTTCTTCGCGCACATACAATTGCACGACAGCAATTGTATGATTTTCTAGGTATGTACAA	3840
Qy	3841	TCCATACTCTGCAGTCTGCATCACACTTTGAAAACAATGACTAAGAATAAACTTGTACC	3900
Db	3841	TCCATACTCTGCAGTCTGCATCACACTTTGAAAACAATGACTAAGAATAAACTTGTACC	3900
Qy	3901	GTATCATCATTAATTGTCAGAGTTTTTGTGTTGCAAGTATCTCAACTTAGTAAGAACAATA	3960
Db	3901	GTATCATCATTAATTGTCAGAGTTTTTGTGTTGCAAGTATCTCAACTTAGTAAGAACAATA	3960
Qy	3961	CATTAACCCAACCTTAGTTTTGTCTCATACTTATCTATCTTCTCTACACAGGGGAGAGTA	4020
Db	3961	CATTAACCCAACCTTAGTTTTGTCTCATACTTATCTATCTTCTCTACACAGGGGAGAGTA	4020
Qy	4021	ATATTGGTTCCATTGTAATCAATGAAAGTGAAAAGGAAGGAGAGGAAGCAAAAAGTTCT	4080

Db	4021		ATATTGGTTCCATTGTAATCAATGAAAGTGAAAAGGAAGGAGAGGAAGCAAAAAGTTCT	4080
Qy	4081		TGGAAAAAGTCCGATCTTCATTTCTCAGGTTGAGAGTCTTGTCATTTCTTTCTGGGTGAC	4140
Db	4081		TGGAAAAAGTCCGATCTTCATTTCTCAGGTTGAGAGTCTTGTCATTTCTTTCTGGGTGAC	4140
Qy	4141		TTATCTTTCTTGCGGTGAGGCACATATAATCTTTGATTAAACATTGGTTTCAGGTTCTCCG	4200
Db	4141		TTATCTTTCTTGCGGTGAGGCACATATAATCTTTGATTAAACATTGGTTTCAGGTTCTCCG	4200
Qy	4201		TGTTGTGAAAACAAAACAAGTAACATATTCAGTGTTGAATCATTTACTCGGTTACATTGA	4260
Db	4201		TGTTGTGAAAACAAAACAAGTAACATATTCAGTGTTGAATCATTTACTCGGTTACATTGA	4260
Qy	4261		AAACCTCGAGAAGGTTGGCTTGTTGGAGGAAAAAGAAATCGCTCATCTTCATGATGCTGT	4320
Db	4261		AAACCTCGAGAAGGTTGGCTTGTTGGAGGAAAAAGAAATCGCTCATCTTCATGATGCTGT	4320
Qy	4321		CCAGGTACCAAATTAAGAATCTCATTCCTTCAACTATAGTCTTGTCTCTTTTGTCTTAT	4380
Db	4321		CCAGGTACCAAATTAAGAATCTCATTCCTTCAACTATAGTCTTGTCTCTTTTGTCTTAT	4380
Qy	4381		GCTTTTGGTCAAATCTATCTCTGCAGACCGGCTTGAAAAAGCTTTTGAGAAACCTCCAA	4440
Db	4381		GCTTTTGGTCAAATCTATCTCTGCAGACCGGCTTGAAAAAGCTTTTGAGAAACCTCCAA	4440
Qy	4441		TAGTTAAACTTCCAAAATTGAGCGACATGATCACCTCACATCCGTTATCGGTTGCTCTTC	4500
Db	4441		TAGTTAAACTTCCAAAATTGAGCGACATGATCACCTCACATCCGTTATCGGTTGCTCTTC	4500
Qy	4501		CTCCTGCATTTTGTGAACCTTTAAACACTCGAAAAAGAACCAATGAACTGCGTGGTG	4560
Db	4501		CTCCTGCATTTTGTGAACCTTTAAACACTCGAAAAAGAACCAATGAACTGCGTGGTG	4560
Qy	4561		TCACGCTTTATAAAGAAGGTTCAAAGCCAACCTGGAGTCTGGCTTATTTTGTATGGCATCG	4620
Db	4561		TCACGCTTTATAAAGAAGGTTCAAAGCCAACCTGGAGTCTGGCTTATTTTGTATGGCATCG	4620
Qy	4621		TTAAGGTAACCCAAAACCTTATCTTTTACTTTTAACTCGTAAGTCTGTATGATCTATTACC	4680
Db	4621		TTAAGGTAACCCAAAACCTTATCTTTTACTTTTAACTCGTAAGTCTGTATGATCTATTACC	4680
Qy	4681		TTCATAACTGAATGTTATAACAATCCTACAGTGGAAAAGTAAGATCTTAAGCAACAATCA	4740
Db	4681		TTCATAACTGAATGTTATAACAATCCTACAGTGGAAAAGTAAGATCTTAAGCAACAATCA	4740
Qy	4741		CTCGCTGCATCCAACCTTTTCTCACGGTAGTACATTGGGACTCTACGAAGTCTCACTGG	4800
Db	4741		CTCGCTGCATCCAACCTTTTCTCACGGTAGTACATTGGGACTCTACGAAGTCTCACTGG	4800
Qy	4801		GAAGCCATATCTGTGCGACTTGATTACAGATTCTATGGTTCTTTGCTTTTTCATTGATAG	4860
Db	4801		GAAGCCATATCTGTGCGACTTGATTACAGATTCTATGGTTCTTTGCTTTTTCATTGATAG	4860
Qy	4861		CGAGAAAATTCTATCACTACAATCAGATTCTACCATCGATGATTTCCCTTGGCAGGTACG	4920
Db	4861		CGAGAAAATTCTATCACTACAATCAGATTCTACCATCGATGATTTCCCTTGGCAGGTACG	4920
Qy	4921		TCTCTATTAGAATCCATTTTAGAGAGACTCATTTCTTGATTGTTAAGTTGCTTCAACTTT	4980

Db	4921	TCTCTATTAGAATCCATTTT	4980
QY	4981	TTTCGGTTTTTTTTTGT	5040
Db	4981	TTTCGGTTTTTTTTTGT	5040
QY	5041	GATATTTGAAAGTGTGGCAATGCAAGAATTACGAGCCCTTGTTTCAACTGAAAGCTCGAA	5100
Db	5041	GATATTTGAAAGTGTGGCAATGCAAGAATTACGAGCCCTTGTTTCAACTGAAAGCTCGAA	5100
QY	5101	ACTTACAACATATGTGACGGGAGAATCAATCGAAATCGACTGCAACAGCATTGGTTTATT	5160
Db	5101	ACTTACAACATATGTGACGGGAGAATCAATCGAAATCGACTGCAACAGCATTGGTTTATT	5160
QY	5161	ATTAGAAGGATTTCGTAAAACCGGTTGGTATCAAAGAAGAGCTTATATCATCTCCCGCCGC	5220
Db	5161	ATTAGAAGGATTTCGTAAAACCGGTTGGTATCAAAGAAGAGCTTATATCATCTCCCGCCGC	5220
QY	5221	ATTATCACCTTCTAACGGGAATCAAAGCTTCCATAATTCATCAGAAGCTTCAGGTAATTA	5280
Db	5221	ATTATCACCTTCTAACGGGAATCAAAGCTTCCATAATTCATCAGAAGCTTCAGGTAATTA	5280
QY	5281	ATTGCACAGTACAGCAGGATCAAACCTTTTTAAATGTCAGCGAATGATATAAATCGAATT	5340
Db	5281	ATTGCACAGTACAGCAGGATCAAACCTTTTTAAATGTCAGCGAATGATATAAATCGAATT	5340
QY	5341	AAATCAAAAATGTGTTTTGTTTTTTTGACCACAGGTATCATGAGAGTCAGTTTCTCACAA	5400
Db	5341	AAATCAAAAATGTGTTTTGTTTTTTTGACCACAGGTATCATGAGAGTCAGTTTCTCACAA	5400
QY	5401	CAAGCAACACAGTATATTGTTGAGACGAGAGCAAGAGCAATCATCTTCAACATTGGAGCA	5460
Db	5401	CAAGCAACACAGTATATTGTTGAGACGAGAGCAAGAGCAATCATCTTCAACATTGGAGCA	5460
QY	5461	TTTGGAGCTGATAGGACTCTACATCGAAGACCATCTTCGTTAACACCACCACGTAGCTCA	5520
Db	5461	TTTGGAGCTGATAGGACTCTACATCGAAGACCATCTTCGTTAACACCACCACGTAGCTCA	5520
QY	5521	AGCTCTGATCAGCTTCAGAGATCATTTTCGTAAAGAACACAGAGGTCTCATGAGCTGGCCT	5580
Db	5521	AGCTCTGATCAGCTTCAGAGATCATTTTCGTAAAGAACACAGAGGTCTCATGAGCTGGCCT	5580
QY	5581	GAAAATATTTACGCCAAACAACAAGAGATCAATAAAACGACATTAAGTTTATCTGAA	5640
Db	5581	GAAAATATTTACGCCAAACAACAAGAGATCAATAAAACGACATTAAGTTTATCTGAA	5640
QY	5641	CGAGCAATGCAACTCAGCATTTTCGGCAGCATGGTAAAAAAGATCTCAATGTTGATTCTT	5700
Db	5641	CGAGCAATGCAACTCAGCATTTTCGGCAGCATGGTAAAAAAGATCTCAATGTTGATTCTT	5700
QY	5701	TTAAAGGTTGTTATCGATGAACTTCTCGACTAACCTGAAGGTTTTTATCTTCTGATATTC	5760
Db	5701	TTAAAGGTTGTTATCGATGAACTTCTCGACTAACCTGAAGGTTTTTATCTTCTGATATTC	5760
QY	5761	TCGAATATAGGTTAATGTGTACAGAAGGAGTGTAAAGTTTCGGTGGGATCTATAATAACAA	5820
Db	5761	TCGAATATAGGTTAATGTGTACAGAAGGAGTGTAAAGTTTCGGTGGGATCTATAATAACAA	5820
QY	5821	GTTACAAGATAACTTGTGTACAAAAAACTTCCACTAAACCCAGCTCAAGGTCTCGTTTC	5880
Db	5821	GTTACAAGATAACTTGTGTACAAAAAACTTCCACTAAACCCAGCTCAAGGTCTCGTTTC	5880

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